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Assessment Of Physical And Mental Functional Status In Post-Surgery Breast Cancer Patients

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ABSTRACT

Introduction: Breast cancer is abnormal growth of cells in the breast. As of the end of 2020, there were 7.8 million women alive who were diagnosed with breast cancer in the past 5 years, making it the world's most prevalent cancer. Breast cancer is also a disease that has the potential to impact on many aspects of a woman's daily life activities including physical abilities, family, career and social world [6]. The treatment of breast cancer is mainly surgical, and hence it is important to assess the functional status of the patients post-surgery.

Aim: To evaluate physical and mental functional status of breast cancer patient's post-surgery using Short Form-36 (SF-36) questionnaire.

Objectives: (1) To assess functional status in breast cancer survivors' post-surgery using Short Form -36 (SF-36) Questionnaire. (2) To determine the most affected domain of functional activities. (3) To compare the functional status after various surgical procedures in breast cancer patients.

Methodology: This is a cross sectional study, where 50 post-surgical breast cancer patients, who had undergone surgical intervention not less than 6 months ago, were administered Short Form-36 (SF-36) self-report functional evaluation questionnaire and the scores of various domains were analyzed to achieve the objectives of the study.

Results: The study included 36% Breast Conservation Surgery (BCS) patients, 27% Total Mastectomy (TM) patients, 24% Modified Radical Mastectomy (MRM) patients and 13% Breast Reconstruction Surgery (BRS) patients. The duration from the surgery had no significant impact on the Functional outcome, but type of surgery had significant effect on the functional outcome. The physical health domain was most affected in Total Mastectomy patients (mean score – 65), while the mental health domain was more affected in both Total mastectomy (mean score – 73.3) and Modified Radical Mastectomy (mean score – 73.9) patients.

Conclusion: The functional outcome in breast cancer patients is affected in all post-surgical cases, and type of surgery has profound impact on the functional outcome. As per this study, the mental health is more affected than the physical health in breast cancer post-surgical cases.

Keywords: Functional outcome, Post-surgical outcome, Breast cancer

INTRODUCTION

Breast cancer is abnormal growth of cells in the breast. Depending on the type of growth, the disease is subdivided in two types - the invasive ductal carcinoma and invasive lobular carcinoma. The type of breast cancer is determined by the specific cells that are affected. Based on which cell origin is involved, breast cancers can be divided into two broad classifications, carcinomas and sarcomas. Carcinomas are breast cancers arising from the epithelial component of the breast, which consists of the cells that line the lobules and terminal ducts responsible for making milk. Sarcomas are a much rarer form of breast cancer[1].

According to World Health Organization, in 2022, there were 2.3 million women diagnosed with breast cancer and 670 000 deaths were caused by breast cancer globally, making it the world's most prevalent cancer. The common symptoms of breast cancer are painless lump, painful lump, pain radiating to neck region, pain radiating to shoulder region, swelling and redness around breast.

The various treatment options for breast cancer are surgery, hormone therapy, radiotherapy and chemotherapy. These treatment options are generally used in different combination according to the stage of the disease. But the surgical intervention remains the mainstay of the treatment. Various surgeries for breast cancer are Modified Radical Mastectomy (MRM), Radical mastectomy (RM), Breast Conservation Surgery (BCS), Breast Reconstruction Surgery (BRS) and Total Mastectomy (TM). Breast Conservation Surgery includes lumpectomy and segmental mastectomy(quadrantectomy). Several factors that favor Breast Conservation Surgery are smaller monocentric tumors; younger age; treatment carried in specialized institutions[2]. The complications of breast conservation surgery are pain, bleeding, infection and temporary swelling. The modified radical mastectomy removes all the breast tissue, the nipple-areola complex, necessary skin and level 1 and level II axillary lymph nodes. The complications of MRM include wound dehiscence, seroma, surgical site infection, hematoma, altered sensation and pain. The total mastectomy removes the entire breast but lymphatics, pectoral muscles are preserved. Complications are postsurgical pain and infection. Radical mastectomy includes removal of the breast, the pectoralis muscles, chest fascia and the ipsilateral axillary lymph nodes. The extent of resection also led to important associated morbidity, paresthesia, lymphedema, rib cartilage or pneumothorax by the perforation of the intercostal space.[4] Hormonal therapy has the purpose of preventing the interaction between estrogens and estrogen dependent pathways of stimulating neoplastic cells. [5]

Breast cancer is also a disease that has the potential to impact on many aspects of a woman's daily life activities including physical abilities, family, career and social world [6]. Cancer patients have many needs. The need for fast and accurate diagnosis and timely treatment is vital, but social support is also an important aspect of modern cancer care (Clark et al., 2006).[7] Lee et al (2005) reported that almost half of patients stated that receiving chemotherapy caused severe disruptions in their lives. The poorest functional status (including inability to perform household chores, work and social activities) is more associated with the chemotherapy phase of breast cancer treatment (Lee et Al,2005)[8]

There are various scales used to assess functional status in breast cancer patients. This study uses the SF-36 to assess functional status in breast cancer patients. The Medical Outcome Study Short Form (SF-36) is a self-administered questionnaire that measures eight domains of Health-Related Quality of Life (HRQOL) including physical problems (PP), bodily pain (BP), vitality (VT), social functioning (SF), role limitations due to emotional problems (RE), mental health (MH), and general health perceptions.[9] As breast cancer affects physical, emotional, mental health and general health perception, SF-36 is the most reliable instrument to assess the functional outcome in post-surgical breast cancer patients. Thus, the aim of this study is to assess functional status in breast cancer survivors through self-administered SF-36 questionnaire.

REVIEW OF LITERATURE

- **Importance of Social Support for Functional Status in Breast Cancer Patients** A study by Sevgi Ozkan, et al was focused primarily on the women's understanding, need for, and use of social support, and how social support impacts on their functional status using the Inventory of Functional Status for Cancer (IFSA-Ca) in patient receiving chemotherapy treatment in breast cancer patients. The main conclusion that can be drawn from this study is that friend support significantly affects both general functional state and social and community activities as it is revealed by the examination of the effect of social support on functional state. Also, general social support scores significantly improve occupational activities.

- **Social support: gender differences in cancer patients in the United Kingdom -** A study by Clarke S A, et al (2006) examines patient preferences and satisfaction with information and emotional support provided by staff and how patients perceive the support they receive. They concluded that Breast cancer patients were more satisfied with access to and the nature of support available to them
- **Chemotherapy induced nausea-vomiting and functional status in women treated for breast cancer-** A study by Lee J, et al (2005) Nausea and vomiting are among the most distressing symptoms for cancer patients treated with chemotherapy. Determining the relationship of each component of Chemotherapy induced nausea and vomiting on the functional status of women undergoing chemotherapy for breast cancer was the purpose of this study. Patients demonstrated significant decreases in the following aspects of functional status as measured by the SF-36: physical functioning ($P < .0005$), role limitations due to physical problems ($P = .003$), general health ($P = .029$), vitality ($P < .0005$), and social functioning ($P = .001$).
- **Functional Impact of Breast Cancer by Age at Diagnosis** - A study by Candyce H. Kroenke, et al. The purpose of this study was to explore changes in physical and psychosocial function before and after breast cancer by age at diagnosis. They concluded that young women may fare worse than middle-aged or elderly women in both physical and psychosocial dimensions after breast cancer diagnosis.

AIM

To evaluate functional status of breast cancer patient's post-surgery using Short Form-36 (SF-36) questionnaire.

OBJECTIVES

- To assess functional status in breast cancer survivors' post-surgery using Short Form -36 (SF-36) Questionnaire.
- To determine the most affected domain of functional activities.
- To compare the functional status of various treatment strategies in breast cancer patients.

METHODOLOGY

Study design: Cross-sectional study
Duration of the study: 6 months
Study subjects: Postoperative breast cancer patients
Sample size: 50 postoperative breast cancer patients
Inclusion criteria
Post-operative breast cancer patients who underwent surgery six months ago or more.
Willing to participate in the study.
Age above the age of 18.
Exclusion Criteria
Unwillingness of the subject to participate in the study.
Less than 6 months since breast cancer surgery,
Terminal- stage breast cancer

Method

- The study comprises of assessing functional status in breast cancer patients' post- surgery.
- SF-36 was used to assess the quality of life in breast cancer patients
- Data was collected from the participants using google forms.
- Each participant was fully explained about the purpose of the study.
- The subjects were assured that the information and their respective identities will be strictly kept confidential.
- The record was recorded and analyzed using Microsoft Excel.
- Data was documented in Microsoft Excel 2019 Spreadsheet. The scores of SF-36 was calculated as per SF-36 scoring manual chapter-6 .
- The formula for calculating was

Transformed Scale = $\frac{\text{(Actual raw score - lowest possible raw score) X 100}}{\text{Possible raw score range}}$

- Mean score of physical health and mental health were calculated.
- The collected data were tabulated and analyzed using Microsoft Excel 2019.
- The categorical variables were persented as percentage.Percentage's mean and standard deviation were calculated.

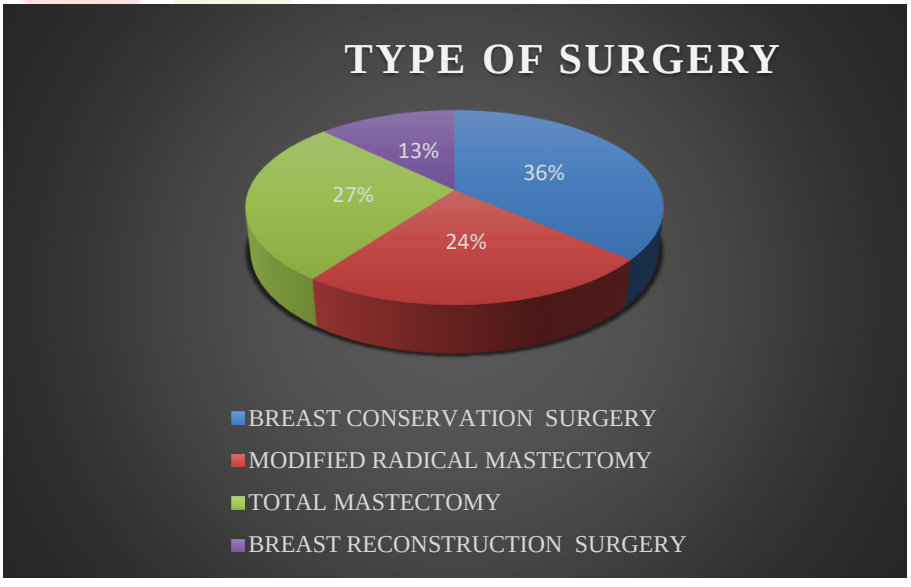
ANALYSIS AND RESULTS

A total of 50 patients were enrolled in the study. Major of the patients were above the age of 60. The mean age of participants was 60.4 ± 13.3 years.

SF-36 QUESTIONNAIRE SCORE FOR VARIOUS DOMAINS (%)

SF36	SF-36 Domain	BRS	BCS	TM	MRM
	Physical Functioning	78.8	67	51	61.
	Role-Physical	78.5	76.2	70	69.2
	Bodily Pain	79.2	74.2	68.3	80.7
	General Health	89.5	73.4	70.9	69.2
Mean	Physical Health Domain	81.5	72.7	65.0	70.2
	Vitality	71.4	65.5	67.3	62.6
	Social Functioning	87.1	79	77.6	73.8
	Role-Emotional	80.9	91.6	74.4	82.6
	Mental Health	89.7	75.3	74.9	76.6
Mean	Mental Health Domain	82.3	77.8	73.5	73.9

Graph 1: Distribution of the Type of Surgery

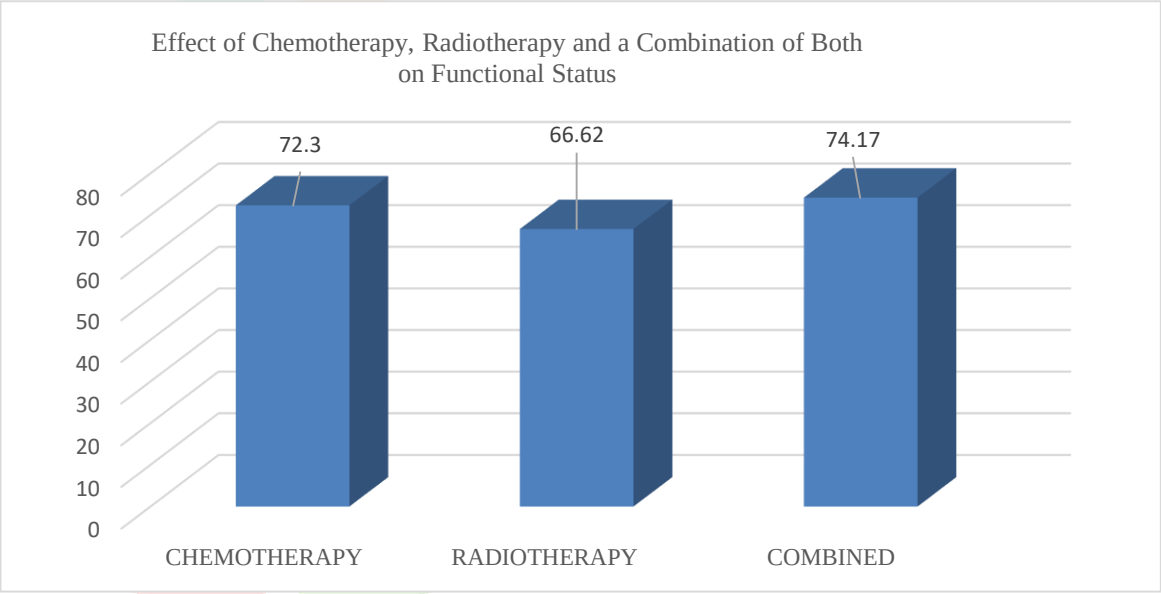


Types Of Surgery	Percentage (%)
Breast Conservation Surgery	36
Modified Radical Mastectomy	24
Total Mastectomy	27
Breast Reconstruction Surgery	13

Interpretation

The graph depicts the various type of surgeries that patients underwent 6 months ago.It can be seen that 36 % of the patients underwent Breast Conservation Surgery (BCS), 27 % of the patients underwent Total Mastectomy (TM), 24% of the patients underwent Modified Radical Mastectomy (MRM) and 13 % of the patients underwent Breast Reconstruction Surgery (BRS).

Graph No.2 : Effect Of Chemotherapy, Radiotherapy and Combination of Both on Functional Status

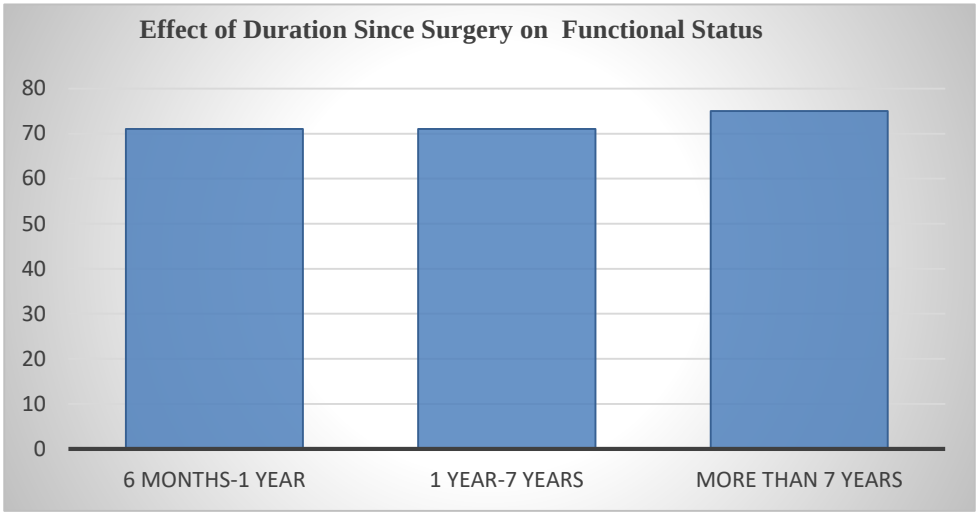


	Chemotherapy	Radiotherapy	Combination
Mean	72.3	66.62	74.17
SD	4.38	1.23	1.48

Interpretation

Though the functional status was not significantly different in three groups, it was lower in patients who received radiotherapy, compared to those who received chemotherapy or a combination of both.

Graph No. 3: Effect of Duration since Surgery on Functional Status

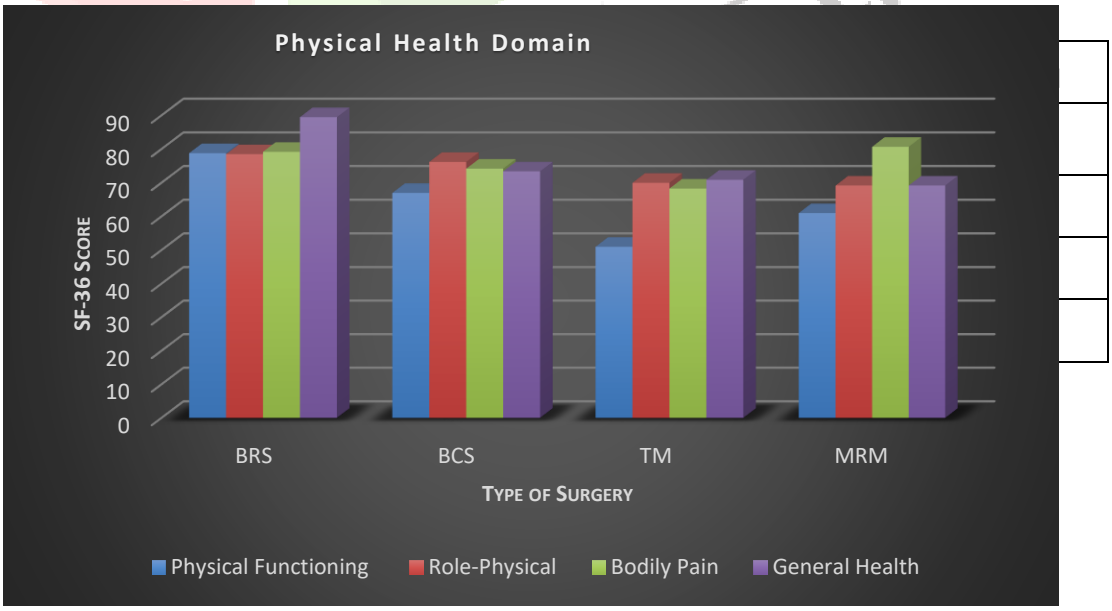


	6 Months-1 Year	1-7 Years	More Than 7 Years
Mean	71.44	71.33	75.24
SD	0.79	1.44	3.6

Interpretation

The graph illustrates that the functional status of the patients didn't change much from 6 months post-surgery to 7 years post-surgery (71% in both cases), but in patients who had surgery more than 7 years back, the functional status was comparatively better (75.24%)

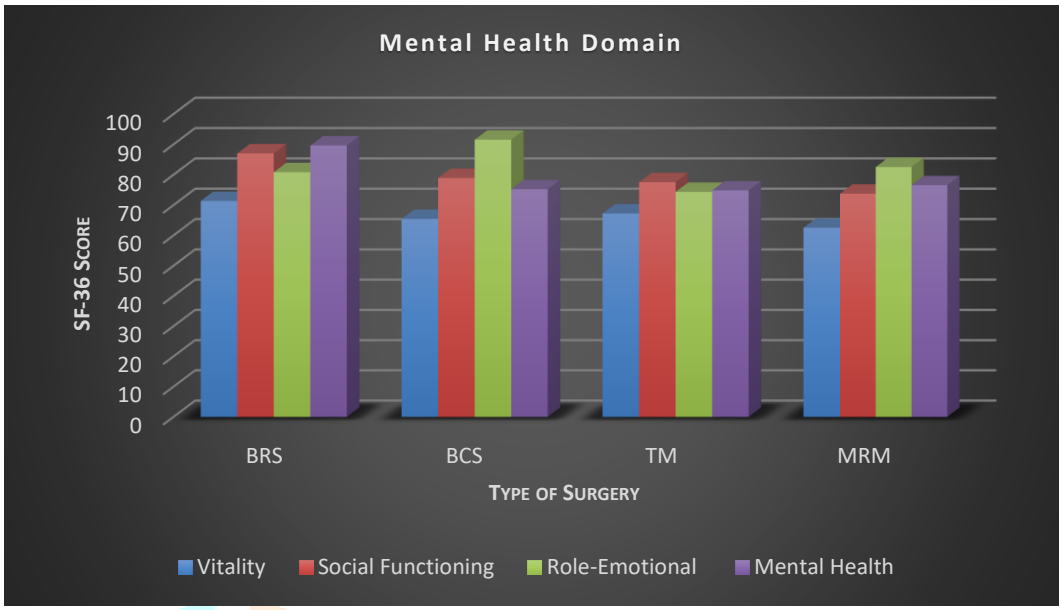
Graph No. 4: SF-36 Physical Health Domain



Interpretation

The graph depicts that there are functional deficits in all areas of physical domain, after any of the breast cancer surgery. But the patients who had undergone Total Mastectomy (TM) show comparatively more affection than other surgery patients in all areas of physical domain.

Graph No.5: SF-36 Mental Health Domain

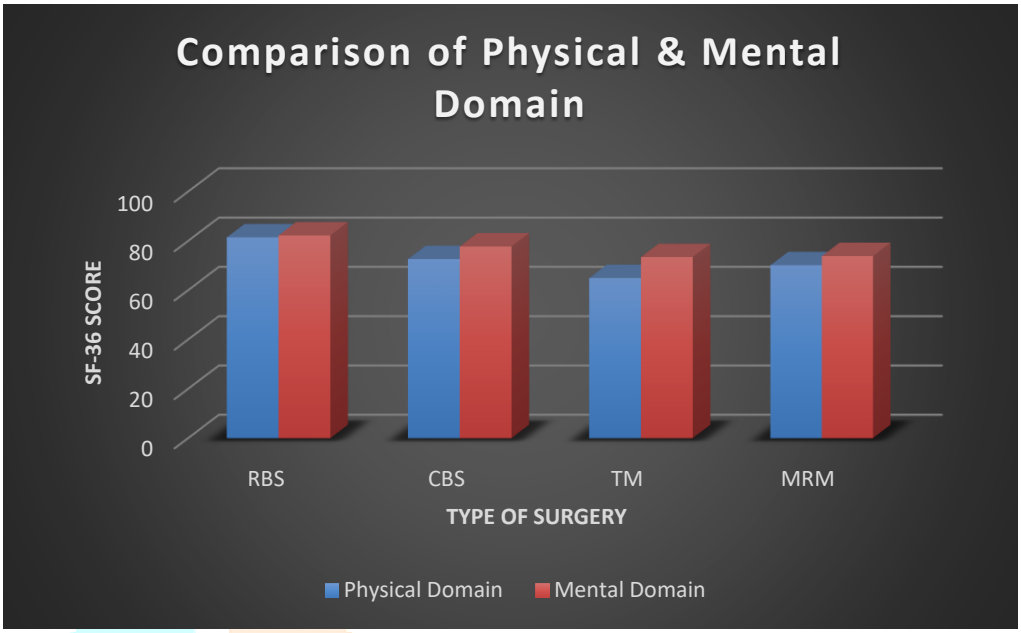


	BRC	BCS	TM	MRM
Vitality	71.4	65.5	67.3	62.6
Social Functioning	87.1	79	77.6	73.8
Role-Emotional	80.9	91.6	74.4	82.6
Mental Health	89.7	75.3	74.9	76.6

Interpretation

This comparative graph also shows that all areas of the mental health domain is affected in all the breast cancer surgeries, but the more affection is seen in Role-Emotional and Vitality, which were significantly low after all breast surgery types. Among the types of surgeries, Total Mastectomy (TM) and Modified Radical Mastectomy (MRM) affected mental health domain more than the Breast Reconstruction Surgery (BRS) and Breast Conservation Surgery (BCS).

Graph No. 6: Comparison of Physical and Mental Domain Functional Outcome in Various Breast Cancer Surgeries



	Physical Domain	Mental Domain
RBS	81.5	82.3
CBS	72.7	77.8
TM	65	73.5
MRM	70.2	73.9

Interpretation

This graph clearly shows that every breast cancer surgery is associated with functional deficits in both physical and mental domain. Though the physical deficits are slightly more than the mental deficits, the difference in both is non-significant.

DISCUSSION

Breast cancer is a type of cancer that starts in the breast .It starts in one or both breasts.There are various types of breast cancer. Most breast cancer are diagnosed after age 50. In our study,we found that the mean age was 60 $\pm$ 13.32.

The different types of breast cancer surgeries are Breast Reconstruction Surgery (BRS) ,Breast Conservation Surgery (BCS) ,Total Mastectomy (TM) and Modified Radical Mastectomy .Breast Conservation Surgery is surgery In our study, 40% of the patients underwent breast conservation surgery, 26% were of the modified radical mastectomy, 30% of the patients underwent total mastectomy and 14% of the patients underwent breast reconstruction surgery.

The current study evaluated functional status using Short Form -36 (SF-36). SF-36 comprises of 36 questions which covers 8 domains of health – physical functioning,role-physical,general health perceptions, bodily pain, vitality, role- emotional ,mental health and social functioning. It is often used as a measure of a person or population's quality of life.

In a previous study, the functional status was assessed in different types of surgeries like Breast Reconstruction surgery (BRS), Breast Conservation Surgery (BCS), Total Mastectomy (TM) and Modified Radical Mastectomy (MRM) by Lee et al. The study concluded that patients demonstrated significant decreases in the following aspects of functional status as measured by the SF-36: physical functioning ($P < .0005$), role limitations due to physical problems ($P = .003$), general health ($P = .029$), vitality ($P < .0005$), and social functioning ($P = .001$)[8].

In our study, it is found that the physical health domain was lowest in Total Mastectomy (TM) followed by Modified Radical Mastectomy (MRM), Breast Conservation Surgery (BCS) and was least affected in

Breast Reconstruction Surgery (BRS). This study also concludes that the mental health domain was lowest in both Modified Radical Mastectomy (MRM) and Total Mastectomy (TM), followed by Breast Conservation Surgery (BCS) and was least affected in Breast Reconstruction Surgery (BRS). Among the mental domain, vitality was found to be affected in all types of surgeries. It should be pointed out that vitality is linked to fatigue. Fatigue is a common and disabling symptom in cancer patients and in patients' survivorship. It can be measured by the vitality subscale of SF-36 questionnaire[16]. Therefore, the above result is an expected outcome as fatigue is a symptom associated with chemotherapy, radiation therapy, surgery, and hormonal therapy. It often persists after the completion of therapy [17, 18].

The study did not find any significant difference in the functional outcome deficits as the duration from surgery increases to 7 years. But patients operated more than 7 years back are found to have lesser functional deficits, which can be attributed to the long-term adaptation by the body to the various impairments and settling of the complications due to the treatment.

The previous literature regarding the adjunct therapies for breast cancer has found chemotherapy to be more debilitating, but this study found no significant difference between the functional deficits caused by the chemotherapy and radiotherapy, with radiotherapy group exhibiting slightly more functional deficits. This can be explained by the fact that the sample size is relatively small and the groups were not completely coherent. Also, the time duration since the adjunct therapy is not been considered.

The most common chemotherapy-related cardiotoxicity observed in breast cancer survivors is left ventricular dysfunction[13]. It has been proposed, that the etiology of cognitive dysfunction in breast cancer patients is likely multifactorial. Though exposure to chemotherapy may contribute, other factors are likely relevant as well, including other modalities of treatment (surgery, radiotherapy, endocrine therapy), supportive care medications, menopausal symptoms, anxiety, depression, fatigue, or other comorbid conditions [12]. The chemotherapy effects may vary in medical severity, but all effects have the potential to lead to a decrease in quality of life and affection of overall health status[14].

Radiation has been found to induce late pericardial disease (months to years after treatment), which may be silent, with the incidental discovery of asymptomatic pericardial effusions, or may present with hemodynamic compromise secondary to a reduction in ventricular filling and cardiac output . Pain after breast cancer surgery can result from injury to muscle and ligaments and is more likely to be transient as compared to persistent neuropathic pain due to damage to the nerve tissue. Skin thickening or fibrosis of the breast or chest wall is observed in about 1/3 of patients[15].

This study found that patients who received radiotherapy as adjuvant treatment had the lowest functional status in various types of surgeries. The functional status of breast conservation surgery who underwent radiotherapy as adjuvant treatment were affected the most as compared to other surgeries.The probable reason is that in breast conservation surgery only lump is removed as it is early stage and to prevent recurrence of breast cancer intensive radiotherapy is given.

This study found that the patients who underwent total Mastectomy were most affected in both physical and mental domain. The reason for mental domain deficits can be poor body image, low future perspecctive, poor body esteem and so on. In physical domain, the most affected area was body pain.

The comparison of physical and mental domain of the SF-36 in various surgeries, showed that both physical and mental health are profoundly affected in post-surgical breast cancer patients, but mental health was more affected than the physical health. This draws focus on the need for the psychological rehabilitation of these patients, along with the physical rehabilitation.

CONCLUSION

- This study concludes that functional status in breast cancer survivors is affected irrespective of the type of surgery.
- Although the functional status improves in the long run (after 7 years), some deficits persist even beyond this time period.
- This study found that the physical health domain was affected after every breast cancer surgery, but was most affected in Total Mastectomy (TM), followed by Modified Radical Mastectomy (MRM), Breast Conservation Surgery (BCS) and was least affected in Breast Reconstruction Surgery(BRS).
- According to this study, the mental health domain was also affected after all surgeries, lowest being after Modified Radical Mastectomy (MRM) and Total Mastectomy (TM) , followed by Breast Conservation Surgery (BCS) and was slightly better after Breast Reconstruction Surgery.

- This study concludes that mental health domain is more affected in post-surgical breast cancer patients, when compared with the physical health domain, and rehabilitation efforts should focus mainly on psychological rehabilitation, which is mostly neglected or side tracked in these patients.

LIMITATIONS

- The limitation of the study was it was time bound study
- For some of participants, it was difficult to talk about that phase as they didn't wanted to recollect the experience they had gone through
- The etiology of the functional deficits was not completely explored
- The study was limited within the city
- Co-morbidities were not taken into account which affects individual's functional status

FUTURE SCOPE OF THE STUDY

- The study can be done at various stages of cancer.
- The study can be done in various population and communities.
- Impact of various co-morbidities along with breast cancer on functional status can be studied in detail

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